CLAIMS

What is claimed is:

1. A system for detecting a breach of an exposure protection device by an amount of a target substance, said system comprising:

an exposure protection device that isolates a protected environment from an external environment potentially including a target substance, the device including a protective covering that includes a substantially transparent window, and

a detector for indicating the presence of a predetermined level of the target substance, the detector being capable of producing a visually observable indication upon detection of the level of target substance; and

wherein said detector is positioned within the protective environment in the vicinity of said window, such that the visually observable indication is observable from the external environment.

2. A system for detecting a breach of an exposure protection device by an amount of a target substance, said system comprising:

an exposure protection device that isolates a protected environment from an external environment potentially including a target substance,

a detector for indicating the presence of a predetermined level of the target substance, the detector being capable of generating an observable indication upon detection of the level of target substance;

wherein said detector is positioned within the protective environment; and

wherein said detector includes a reagent deposit and pyroelectric or piezoelectric element positioned adjacent said reagent deposit, said pyroelectric film being adapted for detecting heat absorbed in said reagent deposit and correspondingly delivering an output signal, upon detection of the amount of the target substance.

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1 3. The system of claim 2, wherein said detector further includes

2 a reader configured to receive the output signal from the pyroelectric film to convert
3 the output signal into a concentration of the target substance.

1 4. The system of claim 2, wherein said detector further includes an alarm configured to
2 respond to the output signal.

1 5. The system of claim 2, wherein said exposure protection device is selected from the
2 group consisting of:

3 a respirator filter; full or half-face respirator; mask-type respirator; chemical suit;
4 protective gloves; or combinations thereof.

1 6. The system of claim 2, wherein said detector is housed within a transparent bubble
2 container integrated with said exposure protection device.

1 7. The system of claim 6, wherein bubble container protrudes outward from said
2 exposure protection device.

1 8. A breach detector apparatus for use with an exposure protection device that isolates an
2 internal protective environment from an external harmful environment, said detector comprising:

3 observable indication means for indicating detection of a target substance, wherein
4 said detector is situated internally of said exposure protection device or in communication with
5 the protected environment.

1 9. The detector apparatus of claim 8, further comprising a transparent enclosure for
2 integration as a window on the exposure protection device, said observable indication means
3 being adapted to generate an indication that is visually observable through said window.

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10. The detector apparatus of claim 8, further comprising:

a reagent deposit; and

a pyroelectric film positioned adjacent said reagent deposit, said pyroelectric film being adapted for detecting heat absorbed in said reagent deposit and correspondingly delivering an output signal upon detection of the target substance.

11. The detector apparatus of claim 8, further comprising: a reagent deposit;

and a pyroelectric/piezoelectric element positioned adjacent to or on said reagent deposit, said pyroelectric/piezoelectric element being adapted for detecting heat absorbed in said reagent deposit and correspondingly delivering an output signal upon detection of the target substance.

12. The detector apparatus of claim 8, further comprising an enclosure with irradiating source acting directly or by fiber optic leading to device over said pyroelectric/piezoelectric element and transforming the signal proportional to the hazardous exposure to electronic processor with specific software.

13. The detector apparatus of claims 8, further comprising an amplifier connected to a controller configured electrical signals to one or more of the following: audible, vibrating, or visual warning devices situated in the field of the user senses and electric signals to translating device for remote warning.

14. The detector apparatus of claim 8 wherein said controller is configured to send signals to a remote monitoring station.

15. A system for detecting a breach of an exposure protection device by an amount of a target substance, said system comprising:

an exposure protection device that isolates a protected environment from an external environment potentially including a target substance; and

a detector associated with said exposure protection device, the detector being reactive with the target substance to indicate the presence thereof, wherein said detector is positioned to communicate with the protected environment; and

an observable indicator operatively associated with said detector and configured to provide an externally observable indication upon detection of the target substance.

16. The system of claim 15, further comprising a covering having a transparent window integrated with said exposure protection device, said observable indicator being positioned in the vicinity of said window and adapted to generate a visually observable indication observable through said window from the external environment.